

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte AKIRA OKAMOTO,
YUICHI SHIMAKAWA and
TAKASHI MANAKO

Appeal 2006-2642
Application 09/198,376
Technology Center 3700

Decided: December 21, 2006

Before CHUNG K. PAK, CATHERINE Q. TIMM, and LINDA M.
GAUDETTE, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims 1, 4-6, 26, and 27, the only claims pending in this application. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 134.

INTRODUCTION

The claims are directed to a thermal control device and a method of controlling the temperature of an object using the device. The device incorporates a variable-phase substance that belongs to a family of oxides of perovskite manganese (Specification 4:3-4). This substance undergoes a transition from an insulator to metal around room temperature (Specification 4:4-5). The substance has an automatic temperature adjusting ability because at elevated temperatures it is in the insulator state and has high emissivity, i.e., it gives off heat, but at low temperatures it is in the metal state and has low emissivity, i.e., it retains heat (Specification 4:5-13).

Claim 1 is illustrative of the subject matter on appeal:

1. A thermal control device comprising:

a substance comprising a perovskite Mn oxide of Mn-containing perovskite represented by $A_{1-x}B_xMnO_3$, where A is at least one of La, Pr, Nd and Sm rare earth ions, and B is at least one of Ca, Sr and Ba alkaline rare earth ions, wherein said substance exhibits emissivity characteristics of an insulator at a relatively high temperature and emissivity characteristics of a metal at a relatively low temperature, said substance having a relatively low emissivity at the relatively low temperature and a relatively high emissivity at the relatively high temperature; and

an object having said substance affixed directly thereto, wherein said substance controls the temperature of said object.

The Examiner relies on the following prior art references to show unpatentability:

Van Buskirk	US 4,310,596	Jan. 12, 1982
Genshiro	JP 401229800A	Sep. 13, 1989
Benson	US 5,562,154	Oct. 8, 1996
Amore	US 5,608,414	Mar. 4, 1997

Urushibara, "Insulator-metal transition and giant magnetoresistance in $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$," Physical Review B, Vol. 51, Number 20, 14103-14109 (May 15 1995).

The rejections as presented by the Examiner are as follows:

1. Claims 1, 4, 26, and 27 are rejected under 35 U.S.C. § 103(a) as unpatentable over Genshiro in view of Urushibara and Van Buskirk.
2. Claims 1 and 4 are rejected under 35 U.S.C. § 103(a) as unpatentable over Benson in view of Urushibara and Van Buskirk.
3. Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as unpatentable over Genshiro, Urushibara, and Van Buskirk as in rejection 1 above and further in view of Amore.
4. Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as unpatentable over Benson, Urushibara, and Van Buskirk as in rejection 2 above and further in view of Amore.

To decide this appeal, we consider the rejections and response to the arguments advanced in the Answer of October 15, 2004 and the arguments advanced in the Brief of February 14, 2003. For each rejection, we select one claim to represent the issues on appeal in accordance with the holding of the Examiner (Answer 3) since Appellants have not challenged this holding, *see Ex Parte Ohsumi*, 21 USPQ2d 1020, 1023 (Bd. Pat. App. & Int. 1991).

We affirm for the reasons well stated by the Examiner. We add the following for emphasis.

OPINION

The Rejection over Genshiro

There is no dispute that, as found by the Examiner, Genshiro describes a substance that undergoes a transition from an electrically highly conductive, low emissivity state to a less conductive, higher emissivity state so that at high temperatures the substance radiates more heat and at relatively lower temperatures the substance radiates less heat (Answer 4-5; *see also* Genshiro, Fig. 2 and pp. 5-6). Further there is no dispute that Genshiro describes an object, such as a satellite, having the substance affixed directly thereto as claimed. The Examiner acknowledges that Genshiro does not specify the use of the claimed perovskite Mn oxide as the thermal transition substance. The issue is whether it would have been obvious to one of ordinary skill in the art at the time of the invention to use a perovskite Mn oxide as claimed in the thermal control device of Genshiro.

We agree with the Examiner that Urushibara and Van Buskirk provide evidence that the use of the claimed perovskite Mn oxide as the thermal transition material in the device of Genshiro would have been obvious to one of ordinary skill in the art (Answer 5-6). Urushibara provides evidence that various perovskite Mn oxides were known to have an insulator-metal transition point wherein at relatively high temperatures the oxide has the relatively high resistivity of an insulator, but at relatively low temperatures the oxide has the relatively low resistivity of a metal (Urushibara, p. 51, § III and Fig. 2). As found by the Examiner, Van Buskirk provides evidence that those of ordinary skill in the art understood the close relationship between the electrical conductance (resistivity) and the optical properties (emissivity)

of these materials (Van Buskirk, col. 1, ll. 47-52). This evidence supports the Examiner's finding that those of ordinary skill in the art would have recognized the perovskite Mn oxides as exhibiting the relevant property required for the substance of Genshiro.

Appellants' arguments fail to persuade us of any reversible error in the position of the Examiner. In fact, the Examiner provides well reasoned responses to Appellants' arguments (Answer 9-10). We need say little more. Suffice it to say that Appellants' arguments do not take into account the knowledge imputed to one of ordinary skill in the art as evidenced by the secondary references. As evidenced by Urushibara, the perovskite Mn oxides Appellants are claiming were known to have the same type of electrical property transition temperature characteristic as the superconductor of Genshiro. That the perovskite Mn oxide is not characterized by Urushibara as a "superconductor" is of little moment. The underlying variable resistivity/emissivity characteristic is the same and Genshiro makes it clear that it is this underlying variable resistivity/emissivity characteristic that makes the substance suitable for the thermal control device (radiating plate). The purpose of the inclusion of prior art in an obviousness rejection is to provide evidence of what those of ordinary skill in the art knew at the time the invention was made. The references serve as a spring board from which the decision maker can step back in time and into the shoes of one of ordinary skill in the art at the time of the invention. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1566-67, 1 USPQ2d 1593, 1595-96 (Fed. Cir.). An express suggestion to substitute one equivalent for another need not be present to render such

substitution obvious. *In re Fout*, 675 F.2d 297, 301, 213 USPQ 532, 536 (CCPA 1982).

Moreover, Appellants' arguments do not address the disclosure within Van Buskirk upon which the Examiner relies. That disclosure provides evidence further indicating that those of ordinary skill in the art would have looked to materials with transitional electrical conductance/resistivity such as those disclosed by Urushibara based upon the close relationship between electrical conductance and emissivity. From the prior art a certain amount of knowledge can be imputed to one of ordinary skill in the art. How that knowledge is stated is of no matter. It need not be conveyed directly nor must it be the main topic of discussion within a particular prior art reference. *See Merck & Co v. Biocraft Labs.*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1847 (Fed. Cir. 1989) (A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art, including non-preferred embodiments); *In re Heck*, 699 F.2d 1331, 1333, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (*quoting In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968))(Use of a patent as a reference is not limited to what the patentee describes as their own invention.).

"A claimed invention is unpatentable as obvious 'if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *In re Gartside*, 203 F.3d 1305, 1319, 53 USPQ2d 1769, 1778 (Fed. Cir. 2000) (quoting 35 U.S.C. § 103(a) (1994)). When the references cited by the Examiner are viewed in light of what they indicate was known in the art, it becomes clear that the use of the known substance

described by Urushibara in the thermal control device of Genshiro would have been obvious to one of ordinary skill in the art.

We conclude that the Examiner has established a prima facie case of obviousness with respect to the subject matter of claims 1, 4, 26, and 27 that has not been sufficiently rebutted by Appellants.

The rejection over Benson in view of Urushibara and Van Buskirk

With regard to the rejection over Benson in view of Urushibara and Van Buskirk, we note that the Examiner relies upon the secondary references in the same capacity as in the above discussed rejection over Genshiro in view of those references. Benson is cited as teaching an object (sidewall 12) upon which is placed a variable emissivity coating 170 (*cf.*, Figs. 5, 6, and 12) of thermochromic material. While vanadium oxide is exemplified as a useful thermochromic material, as found by the Examiner, Benson states that other thermochromic materials can be used (Answer 7 *citing* Benson, col. 13, ll. 58-62). We agree with the Examiner that one of ordinary skill in the art would recognize the perovskite Mn oxide of Urushibara as having the necessary thermochromic property for use in the variable emissivity coating of Benson. Note that Benson counsels the use of substances that exhibit high thermal emittance when in an electrically insulating state and exhibit low thermal emittance when in a metallic state (Benson, col. 13, ll. 9-25). Benson, as well as Van Buskirk, therefore, recognizes the close relationship between electrical properties and emissivity.

Appellants argue that Urushibara does not state or imply that the perovskite Mn oxides have any relation to the materials of Benson. But there need be no explicit disclosure here to support a prima facie case of

obviousness. One of ordinary skill in the art would recognize, based on the disclosure within Urushibara, that the perovskite Mn oxides having the insulator-metal transition characteristic (resistivity varies with temperature) have the thermochromic properties required by Benson. The prima facie case of obviousness flows from the similarity in material properties.

We conclude that the Examiner has established a prima facie case of obviousness with respect to the subject matter of claims 1 and 4 that has not been sufficiently rebutted by Appellants.

The Rejection of claims 5 and 6 over Genshiro in view of Urushibara and Van Buskirk and Amore

Amore was added to the above discussed rejection over Genshiro, Urushibara, and Van Buskirk to reject claims 5 and 6.

With respect to claim 5, Appellants advance no arguments over and above those discussed above.

With respect to claim 6, Appellants argue that none of the four relied upon references shows the use of the claimed Mn perovskite oxide in connection with a satellite or spacecraft. As pointed out by the Examiner (Answer 11-12), this argument does not address the Examiner's rejection. Genshiro discloses the use of a thermal transition substance on a satellite. The Examiner has established that those of ordinary skill in the art would recognize those Mn perovskite oxides of Urushibara having an insulator-metal transition as suitable thermal transition substances based on the disclosure of the close relationship of resistivity/conductance to emissivity that was known in the art as evidenced by Van Buskirk. The prior art as a whole supports the position of the Examiner by a preponderance of the evidence.

Appellants have not sufficiently rebutted the Examiner's prima facie case of obviousness.

The rejection of claims 5 and 6 over Benson in view of Urushibara and Van Buskirk and Amore

With respect to claim 5, Appellants advance no arguments over and above those discussed above.

With respect to claim 6, Appellants again argue that none of the four references show the use of Mn perovskite oxide in connection with a satellite or spacecraft. This argument does not address the Examiner's rejection which is based upon a combination of references.

Appellants have not sufficiently rebutted the Examiner's prima facie case of obviousness.

CONCLUSION

In summary, the Examiner rejected claims 1, 4-6, 26, and 27 under 35 U.S.C. § 103(a). Based upon a review of the totality of the evidence of record with due consideration of the arguments advanced by the Appellants, we conclude that a preponderance of the evidence supports a legal conclusion of obviousness within the meaning of 35 U.S.C. § 103(a). We, therefore, affirm.

AFFIRMED

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